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AUTHOR Martin, David Alan
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ABSTRACT

The author states that learning theory is useful for economic educators because it enables them to develop instructional theory for economic education. The paper is arranged into five parts. Part 1 focuses on the historical learning theory perspective of economics education. Part 2 defines instructional theory, states its relationship to learning theory, and describes the attributes of good instructional theory. The third part reviews three learning theories--developmental, information processing, and operant conditioning--and their implications for economics education. Part 4 describes an instructional theory that incorporates these three learning theories and also possesses the desirable attributes of good instructional theory. The paper concludes with a discussion of the limitations of applying cognitive learning theories to economics education. The appendix contains specific instructional practice suggestions from developmental theory. (RM)

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IMPLICATIONS OF LEARNING THEORY FOR ECONOMIC EDUCATION*

David Alan Martin
The Schuylkill Campus
The Pennsylvania State University

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Introduction

A more precise but less grandiose title for this paper would be "Some Implications of Some Learning Theories for the Development of Economics Instructional Theory." The domain of learning theory is large. Its market is unfortunately not monopolistic. At best what we have is an oligopoly with several prominent firms and a bevy of would-be's. The case might even be made for a monopolistic competition classification.

There are many suppliers of differentiated products, and unfortunately there is little hope for a long-run exodus of firms or a short-run shut-down.

> "It is doubtful that a commonly agreed upon set of learning theories will emerge in the next twenty years." (Shepardson and Schug, p. 76)

Learning theory is useful for economic educators in-so-far as it enables the development of guidelines for instructional practice; i.e., can be used to develop instructional theory for economic education. The first segment of this paper describes the learning theory perspective that has strongly influenced the economic education movement to date, and notes criticism from contemporary learning and instructional theorists of some curriculum materials resulting from the movement's learning theory orientation. Part two defines instructional theory, states its relationship to learning theory and describes the attributes of good instructional theory. Part three reviews three learning theories and their implications for economic education. Part four describes an instructional theory which incorporates the three learning theories described in Part III and also possesses the desirable attributes of good instructional theory developed in Part II. Part five discusses some limitations of applying cognitive learning theories to economic education.

Part I: The Historical Learning Theory Perspective of Economic Education

The economic education movement appears to have been very strongly influenced by Jerome Bruner's statement that (1960, p. 33)

> Any subject can be taught effectively in some intellectually honest form to any child at any stage of development.

The Scope and Sequence Outline for Teaching Economics (K-12) developed by the Economic Literary Council of California (Little and Highsmith) places the understanding that scarce resources require choice at the kindergarten level. Donald Davison's survey of K-6 curriculum materials found at least 80% of the materials included in the study taught specialization and division of labor in the primary grades, 60% taught specialization and interdependence and 40% taught unlimited wants (Davison, 1982).

However, there is some doubt among contemporary learning and instructional theorists about whether abstract concepts should be taught at an early age. Shepardson and Schug (p. 80) suggest that it is premature to teach concepts such as scarcity to kindergarten children. Wittrock, while agreeing with Shepardson and Schug regarding the inappropriateness of teaching scarcity at early ages, adopts the flexible position that an abstract concept should be taught at an early age only if it is critical to the instructional program. Thus it seems that economic educators might profit from re-examining their past efforts in light of contemporary learning theory.

These comments do not lessen the contribution made by the developers of the present scope-sequence pattern in economic education. While questions have been raised about the appropriateness of some present practice, additional empirical work needs to be done to settle the issue. Hilgard and Bower (p. 610) also remind us that

> applied science can't wait for the answers of pure science to come in: crops must be planted and gathered, the sick must be treated, and children must be taught with whatever tools and knowledge are available at the time... Skilled teachers contribute to educational advance, with students of the psychology of learning sometimes bringing up the rear.

Part II: Learning Theory and Instructional Theory

In addition to aiding in the review of our past instructional practices, learning theory should guide the development of instructional theory in economic education. Instructional theory is (Snelbecker, p. 116)

> an integrated set of principles which prescribe guidelines for arranging conditions to achieve educational objectives.

No single instructional theory presently exists and Gage (1977) calls for the development of instructional theory for different academic disciplines-English, Mathematics, Science and Social Studies. Mathematics educators have had a head start in developing their instructional theory and economic educators might benefit by reviewing works such as The Psychology of Mathematics for Instruction by Resnick and Ford.

Instructional theory differs both in its objectives and its substance from learning theory. Learning theory is descriptive and explanatory while instructional theory is prescriptive--it deals with recommended practice. (Hilgard and Bower, p. 607). Learning theory is analogous to positive economics while instructional theory corresponds to normative economics. Instructional theory must consider the school setting and curriculum (Hilgard and Bower, 1975, p. 607) and may be based on several learning theories (Elkind).

Jerome Bruner states that instructional theory should be based on learning theory and he lists four attributes of good instructional theory (Bruner, 1966, p. 40):

1. Predisposition to Learn. A theory of instruction must be concerned with the experiences and contexts that will tend to make the child willing and able to learn...

2. Structure of Knowledge. A theory of instruction must specify the ways in which a body of knowledge should be structured so that it can be most readily grasped by the learner.

3. Sequence. A theory of instruction should specify the most effective sequences in which to present materials.

4. Reinforcement. A theory of instruction should specify the nature and pacing of rewards, moving from extrinsic rewards to intrinsic ones.

Thus learning theory is an important and relevant ingredient for the construction of economic education instructional theory.

Part III: Implications of Three Learning Theories for Economics Education Instructional Theory

The three learning theories selected for this review include developmental, information processing and operant conditioning.

Developmental Theory[1]

Developmental theory is dominated by the work of Jean Piaget. Pigetian theory holds that children and adolescents go through a series of four developmental stages over time and their perceptions and ways of thinking about their world vary over these stages. The first stage is "sensory-motor" (from birth to two years) during which time activities are primarily motor, reflex reactions and imitation. The second stage is "pre-operational" or "pre-logical" (from 2-7 years) in which children's thinking is perception-bound and ego-centric. Explanations are made to sound logical during this stage but causality logic is often lacking. In the third stage, concrete operations (ages 7-11), students are able to classify and order existing data, but cannot hypothesize and manipulate situations beyond their

immediate environment. Stage four, formal operations (ages 11-15), is comprised of hypothetical-deductive thinking. Propositions are examined as possible explainers of events. Physiological maturation, experience and social transmission are said to foster movement from one stage to another.

While research findings from many disciplines support a general stage-related cognitive development theory (Shepardson and Schug, p. 23), there is disputation about how rigidly defined these stages are. Some studies find concrete operational and pre-operational thinking by the same person in two different content areas (Resnick and Ford, pp. 174-175) and the ages associated with Piagetian stages may not be very precise. Many high school students don't possess formal operational reasoning skills (Shepardson and Schug, pp. 23-24). There is also a debate about whether stage development can and should be accelerated. The general consensus seems to be that it can be in certain circumstances but often at a cost to the learner and the teacher/institution to make it likely that costs exceed benefits.[2]

Shepardson and Schug (pp. 5-6, 8) draw two conclusions from their review of developmental research:

1) Primary-aged children's economic concepts are ego-centered; dominated by deference to authority; and perceived in a concrete, perceptually bound, literal manner.

2) The ability to deal with logical abstractions and relationships between concepts increases with age.

Supporting these conclusions they cite studies showing that young children perceived monetary payment for goods as something required by law or morality instead of one element of an exchange (Burris) and that children perceived prices as being set by either their parents or the store clerk in the mechanistic fashion of applying the price tag (Fox). To a group of 1st grade children a "bank" is a "piggy bank" and when asked what money will buy

they respond by listing items such as toys, dolls, candy, a trip, drinks, etc. (Sutton). Early primary children were found to perceive value as measured by physical attributes (size, sturdiness) while older primary children perceive value to be related to usefulness (Burris). Strauss found similar developmental changes with respect to money, profit and credit.

With regard to the issues of stage distinctiveness Shepardson and Schug (p. 11) note that there is evidence of higher order thinking for simpler economic concepts (such as opportunity cost) at young ages but lower order thinking about more complex concepts (such as monetary value) at older ages (Schug, 1980, and Armento, 1978). Kourilsky found that young children can understand economic concepts such as scarcity, supply, demand and opportunity cost when they are taught with an appropriate methodology. Thus stages may not exist as clear cut "all or nothing" events.

In addition to noting some needed areas of research, Shepardson and Schug see two main implications of developmental theory for economic education. First, they question whether we should be trying to teach abstract concepts at the primary level. They suggest instead that we should focus on enriching the child's understanding of such concepts as store, consumer, production money and government through field trips, simulations and other activities. These activities will provide an enhanced cognitive structure, improving their capacity to store, retrieve and manipulate these concepts (pp. 78, 80). Second, they suggest that most of the curriculum materials at the high school level require formal operational skills which many high school students don't possess (pp. 23-24).

In terms of Bruner's four attributes of good instructional theory, Piagetian developmental learning theory clearly addresses the predisposition to learn as it relates to the abilities of students to engage in various

types of learning because of their maturational/experiential development stage. Economic educators need to be aware of the developmental level of their students when designing curricula.

The next learning theory considered, information processing, emphasizes the cognitive processing of students and their cognitive structures.

Information Processing Theory

Information processing theories are concerned with the manner in which the mind processes new information. Modeling aspects of computers, the mind is perceived as containing a sensory register, a short-term memory and a long-term memory. Sensory information comes into the sensory register. Some of this information is put into short-term memory for further processing. Short-term memory is limited in the amount of information it can hold and the length of time it can be held. It is estimated that 5-7 items is the maximum capacity of short-term memory (Miller) and that the maximum normal duration of images is about 20 seconds (Woolfolk and Nicolichi, p. 224). The life of short-term memory images can be extended by rehearsal. Information is transferred from short-term memory to long-term memory through a process known as semantic coding--the organization of information according to its meaning. Information can be stored in long-term memory in concept hierarchies, images and other forms. Long-term memory has a practically unlimited capacity, but accessing items depends on its organization.

Information processing theory implications for economics instruction theory focus on the capacity limitations of short-term memory and the semantic coding process in long-term memory transfer.

With regard to short-term memory capacity we need to be wary of over taxing the students short-term memory. This is especially true of young

children who are not able to manage a large number of variables or hypotheses simultaneously. Shepardson and Schug (p. 74) note that one way of dealing with limited short-term memory is to "chunk" information. Rather than have students working with the separate concepts of "unlimited wants" and "limited resources," these could be combined and learned as "the wants-income gap" as Donald Davison has suggested (Davison, 1977).

David Ausubel and Jerome Bruner have dealt with the semantic coding process and the establishment of concept hierarchies. Two implications for economic educators can be drawn from their work. First, it is important to know the discipline-related hierarchical concept structures possessed by the learners so that instruction can be designed which enables efficient semantic coding. Such assessment also enables the instructional theorist to determine how the cognitive structure must be altered in the instructional process. Second, the focus on the hierarchical nature of long-term memory suggests a need for a hierarchical structuring of discipline content. Both Bruner and Ausubel would provide students, in an appropriate way, with these most general concepts; Bruner to foster discovery learning, and Ausubel in the form of advance organizers.

Information processing theories thus have implications for the first, second and third elements in Bruner's list of attributes of good instructional theory. The final learning theory discussed here, operant conditioning, focuses on reinforcement, the final element of Bruner's list.

Operant Conditioning

Operant conditioning (or stimulus-response) theories focus on learning as the reinforcement of learner response to stimuli. B. F. Skinner and Thorndike are notable developers of this field.

Operant conditioning will receive brief treatment here. It deals with such issues as identification of possible responses and available reinforcers, the salience of stimuli, and the sequencing and scheduling of reinforcement (Skinner). Thorndike has emphasized the need for drill and practice to provide automaticity.

Part IV: A Developmentally Based Theory and Technology of Instruction[3]

Case has developed a theory of instruction which blends the three learning theories described above and satisfies Bruner's criteria for good instructional theory. Case argues that young children err in developmental tasks because they employ strategies which are incomplete rather than incorrect and because of their limited working memory space; "they tend to develop reasonable but oversimplified strategies for coping with the tasks they are given at school" in part because they can't cope with the informational processing demands of the learning situation.

Three principles guide the instructional design.

1. Precede the design of instruction with a step-by-step description not only of the strategy to be taught but also of the strategy or strategies that children apply to the instructional task spontaneously.

2. Design the instruction in such a way that the limitations of children's spontaneous strategies will be apparent and that the necessity of applying the strategy to be taught will therefore be clear.

3. Both in selecting the strategy to be taught and in designing the sequence of instructional activities to teach it, reduce the working memory requirements of the learning.

Case also enumerates the component parts of each principle.

For the first principle 6 steps are identified:

1) observe the children as they perform the task, 2) generate hypotheses about the nature of the oversimplified strategy, 3) identify the proper

hypothesis by varying the task and observing behavior, 4) determine the strategy used by experts, 5) detail the requirements of each step of the novice and expert strategies, 6) suggest a modification of the expert strategy that the processing skills of the novices can accommodate.

Six steps are also identified for the second principle: 1) design a procedure so the child will be able to determine whether or not his current strategy is effective, 2) create a set of specific situations in which the child comes to realize that his strategy doesn't always work, 3) assist the child in understanding why his strategy won't work, 4-5-6) demonstrate the correct strategy, explain why it works and provide practice.

Three elements comprise the third principle: 1) consider the amount of information that must be attended to at a given time (it is directly related to working memory requirements), 2) consider the familiarity of information-the more familiar (automatic) the less is demanded of working memory, 3) create salient stimuli (the more salient the stimuli, the less the working memory load).

Case has given attention to the learner's cognitive development stage (Piaget) and cognitive structure (Ausubel) in the determination of the over-simplified procedure. We see attention to the structure of the discipline through the determination of the expert's technique, and attention to working memory limitation (information processing) and salience of stimuli (Stimulus-Response).

Part V: Limitations of Learning Theory

This final section considers some limitations of learning theory and a pitfall or two in its application. A complete instructional theory should consider the whole student. Zigler and Kagan list several principles of

child behavior relevant to instructional theory: 1) human development is more than the cognitive--it incorporates the social, emotional and physical domains, 2) children benefit if they experience a sense of continuity between spheres of their lives--school-home-community, 3) children and families are heterogeneous and have diverse needs, and 4) since the family and social institutions have important influence on a child's growth, instructional theory must keep abreast of changing family and social patterns.

Two pitfalls are associated with the application of learning theory to instruction. First, identified by Hilgard and Rower (p. 607), is the inappropriate application of what little we do know.

> ...we do not support the "medicine cabinet" view of application... (rather learning theory) helps us to understand what some of the important variables and influences are... A skilled teacher may understand better why some practices work and others do not... (learning theory may) point out where to look and what to expect.

The second, noted by Bower emphasizes how little we presently know.

> We are largely ignorant when it comes to answering questions about vital issues in education. What should be taught? How should it be taught? What are the consequences of teaching this rather than that, of teaching it now rather than then, of teaching it this way rather than that way, to this person as well as that person. We don't know.

Conclusion

Learning theory can make a positive contribution to the refinement and expansion of economic education. It can inform us about some of the learning-related characteristics of our students and sensitize us about the need to undertake the research required for a greater understanding. The quotation from Rower over-states the point; we do know something, but we need to know much more. The development of a comprehensive set of instructional theories for economic education needs to be based in part on learning theory

oriented research: What are the preconceptions and thought patterns about economics that students at various ages possess? What economic concepts fit the intellectual capabilities of students at various ages? What types of instructional activities are best suited to particular concepts at particular ages?--to name just a few. The agenda is an interesting and exciting one.

Appendix

Another element of my assignment is to describe the implications which can be drawn from learning theory for teaching economics students in three age groups: 4-5, 10-11 and 13-14. I will make my comments chronologically-so to speak.

Four and Five Year-olds (Pre-operational)

Developmental theory tells us that these children tend to possess understandings that are limited to their personal experiences and perceptions, ego-centric, and their thinking processes are pre-logical. It is important to provide them with direct hands-on experiences and simulations to enrich their cognitive structure and provide a greater base for abstract concepts in later years. For example, a scarcity experience might be provided where each child only gets half a cookie--scarcity meaning then that "I have less than I want." Money can be introduced as "something that is used to buy things," and students get to touch and feel currency and coins. Rewards must to a great extent be externally supplied. Abstractions about things the child has not personally experienced should be avoided. The cognitive structure can be enhanced by labeling experiences the child is having and objects the child is observing and manipulating.

Ten and Eleven Year-olds (Concrete Operational)

Developmental theory tells us that these students are less ego-centric, they can classify and maniuplate existing data and things at hand, but they cannot hypothesize about situations beyond their immediate enviornment. Instruction might involve more group-oriented simulations such as mini-society, production teams, etc., utilizing a social orientation. Intrinsic (internal) rewards are becoming stronger but external rewards are still much

needed. With regard to the concept of scarcity, students should be able to think in terms of "we have less than we want." They should be able to classify situations with regard to the presence or absence of the scarcity condition noting both its qualities: "wants" and "availability," e.g., air, time, the Trade-offs situation of insufficient land and building materials. With regard to money, studying about a bank at a very low level of abstraction, perhaps with a field trip, seem appropriate.

Thirteen and Fourteen Year-olds[4]

Students in this age group can conceptualize about historical time geographic space, logical relationships and causality. Up until now their perceptions of the world were primarily based on what they have experienced. They now are becoming aware of "an autonomous world that is separate from and indifferent to the students' thinking." In dealing with this newly discovered world the student makes what Egan calls romantic associations; they associate with people who have overcome its potential hostility--the courageous, noble and powerful historical persons. Additionally students are fascinated with the extremes and limits of what is known and can be done. Students like to know what it would feel like to live in another time or place. Finally, students are said to like the story form in learning. They prefer clear and powerful heroes and heroines, exotic but plausible settings, and emotional signals should be clear. Robinson Crusoe is said to be a prime example of such stories.

Because of fascination with the exotic and the different, content should focus on economic activities in different times and different environments; especially the novel and the extreme. Rather than finding something that is similar to their experience in a lesson, we ought to seek out

that which is different. The depression, inflation in post WWI Germany, the trusts of the late 1800's and early 1900's, bank panics during the 18[illegible] etc. Once their curiosity is established these students are said to be obsessed with detail. How, exactly, this international banker transfer money from New York to London? How, precisely, were trusts created? Finally, the fascination with the hero and heroine suggests that biographies and autobiographies of great and powerful historical persons such as the John Rockefellers, Samuel Gompers and Benjamin Strongs as well as the "different" Terrence Powderly's and Joe Hill's.

As professionals we tend to prefer the "typical," and the generalization. Students at this age desire the unusual. Their orientation is necessary for further cognitive development. In Egan's words

> ...the power of the general scheme (cognitive structure) students will develop will be determined by the amount and range of knowledge (previously acquired)... A crude mass of knowledge about a wide variety of things seems important for further educational development.

Summary

This appendix has attempted to develop some specific instructional practice suggestions derived from some selected developmental theory. To a great extent these have been speculations. Further refinement and empirical testing are needed.

Footnotes

1. This review of developmental theory and its implications draws heavily from the work of Shepardson and Schug.
2. Resnick and Ford (p. 188) note that acceleration may be appropriate for the formal operations because some cultures never developed fully operational thinking.
3. This explication of Case's theory is taken from his 1978 Review of Educational Research article.
4. This discussion is based on "The Student and the Secondary Social Studies Curriculum," by Kieran Egan, in the Journal of Educational Theory and Research, pp. 1-19.

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